Jacobi (Mary P.)

Case of Tubercular Meningitis, with Measurements of Cranial Temperatures.

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IN the child, an infant of 22 months, upon whom the following observations were made, a general miliary tuberculosis as developed from the broncho-pneumonia of measles, of which there was an attack about the middle of August. It was under observation for a month, with general and pulmonary symptoms, but without any cerebral symptoms whatever. These first appeared on the 9th of October, and consisted in drowsiness, vomiting, retractions of the head with rigidity, hard irregular pulse, Cheynes-Stokes respirations; apathy succeeding to restlessness and constant crying; beginning retraction of the abdomen instead of the tympanitis hitherto existing.

The first cranial temperatures were taken the day following that on which these symptoms were first observed at the dispensary. They are compared with the normal average, as given by Dr. Gray:

Right vertical,	95¼°	Normal average,	91.67°
Left "	95¾		
Right frontal,	97¼	" "	93.71
Left "	96½	" "	94.36
Right occipital	99¼	" "	91.94
Left "	99¼	" "	92.66

On this day the parietal temperatures, just above the ear, were not taken.

On the 12th of October, the following temperatures were obtained:

Right frontal,	98¾°	Normal average,	93.71°
Left "	97¼	" "	94.36
Right parietal,	97½	" "	93.59
Left "	96½	" "	94.44
Right occipital,	96¼	" "	91.94
Left "	96	" "	92.66
Right vertical,	95½	" "	91.67
Left "	95¼		

Rectal temperature still 102. On the 14th the temperatures were taken for the third and last time.

The meningitis was then passing into the third or paralytic stage, and paralysis of the right arm occurred in the evening. In the morning of that day the rectal temperature was 99. The pupils dilated, but equal.

Right frontal, - - -	95½°	Normal average,	93.71°
Left " - -	93½	" "	94.36
Right parietal, - - -	94½	" "	93.59
Left " - -	94½	" "	94.44
Right occipital, - -	95¼	" "	91.94
Left " - -	92½	" "	92.66
Right vertical, - - -	92½	" "	91.67
Left " - -	94		

The child died the next day; an autopsy revealed the expected generalized miliary tuberculosis, and the following lesions in the brain which I alone transcribe:

EXAMINATION OF THE BRAIN.

Dura adherent in several places to skull. Internal surface adherent in several places to visceral arachnoid.

About ½ pint sanguinolent serum escaped during removal of brain from skull. Much escaped upon first opening dura, showing that it came from meshes of pia on convexity.

In removing dura, the surface of the brain was found pale, shining, soft, evidently highly œdematous. The surface was less rather than more vascular than usual; convolutions slightly flattened.

The arachnoid connecting the convolutions was in several places opaque, but generally not adherent; on cutting it, the pia lining the sulci was everywhere found injected with fine arborizations of varying intensity. Of all examined, the sulcus between the first and second frontal convolutions on the left side, was found the most intensely injected.

A very large vein was observed to run horizontally around the extremity of the frontal convolutions in both hemispheres. The left vein was the largest, and reached backwards as far as the external extremity of the anterior central convolution.

On the left side the three frontal convolutions were tolerably firm. But at the anterior tip of the inner part of the first

were several minute patches of opacity in the arachnoid. An inch further back, in the first subsulcus, were opacities extending all along a blood vessel lying in the sulcus, and three distinct yellowish patches crossing it.

The posterior extremity of this first frontal convolution presented a group of radiating opacities just at the edge of the longitudinal fissure of the brain, and extending back to the anterior central convolution. External to this, an intensely injected patch about ½ inch square with a minute hemorrhage extending into the præcentral sulcus.

The inner extremity of the anterior central convolution was injected, and with two or three quite distended vessels, for a distance of one inch from margin of fissure.

In the fissure of Rolando, and in the sulcus præcentralis, the arachnoid was opaque, the pia, injected, adherent, and with minute tubercles along vessels.

In the sulcus calloso-marginalis and over the gyrus fornicatus, the pia was infiltrated with minute elevated opacities.

The superior lobule of the parietal lobe, also superior part of the occipital lobe, were free from injection, opacities, or softening.

Right Hemisphere.—Anterior tip of the first frontal convolution presented a patch of softening, occupying the entire breadth of the convolution. This was followed by about an inch of relatively firm brain substance. Posteriorly to this, was another patch of softening extending from the longitudinal fissure to the superior frontal sulcus. All this portion of brain was paler than normal.

But from the posterior patch of softening, two large veins extended backward to the transverse sulcus anterior to the sulcus præcentralis. The anterior extremity of the most internal of these veins was covered with thickened yellowish opacities, presumably tuberculous. Similar deposits infiltrated the pia of the sulcus.

The sulcus præcentralis was occupied by a distended vein, immersed in yellowish deposit. Another deposit, the largest observed on the convexity, was at the inner extremity of the fissure of Rolando. Internally to it, was a patch of infiltration extending over the border of the longitudinal fissure. In this

patch, about an inch square, there were no blood vessels, but the arachnoid was smooth, white, opaque.

There was a small amount of infiltration along the middle of the inter-parietal fissure.

On separating the hemispheres, the corpus callosum was found to be completely softened and broken down, so that it tore at the least touch, exposing the ventricles. These contained little serosity, this having probably escaped. The ventricles were somewhat dilated. The fornix was completely softened. The third ventricle was full of sanguinolent serum.

The head of the *right* corpus striatum was very soft. The *left* was tolerably firm.

The thalami were firm.

The corpora quadrigemina were firm, as also the peduncles passing from them to the cerebellum.

The superior surface of the cerebellum was firm and not injected. There were no tubercles evident in the choroid sulcus or in the tænia semicircularis.

The brain was then laid on one side, and the lateral convolutions examined on the

Left Side.—The pia was infiltrated over the secondary sulci of the lateral part of the third frontal convolution. Nothing observed over ascending ramus of fissure of Sylvius, nor over the superior or middle temporal fissures.

Right Side.—A patch of softening was found at the angle of the supra-marginal convolution, where it curves around the Sylvian fissure to meet the inframarginalis of the temporal lobe. The primary occipital gyrus of the cuneus was the seat of a patch of intense injection, but no infiltration. Entire right hemisphere softer than left.

Base of Brain.—Arachnoid was everywhere thickened and opaque, but not injected. Similarly the arachnoid on inferior surface of cerebellum. This surface was extremely soft. Right olfactory tract and bulb destroyed. The left softened. Pia along both Sylvian fissures adherent. On separating the temporal from the anterior lobes, the Sylvian fissures were found occupied by a fibrinous exudation, infiltrated with a viscid amber colored fluid.

The tip of the left temporal lobe—*i. e.*, the anterior part

of the second temporal convolution—was completely softened, over a space the size of a walnut. In the anterior part of this softened patch was a cavity, which might have contained a filbert. This cavity was completely empty, but evidently of recent origin and probably contained pus, which had escaped with the other fluids during the removal of brain. The cavity was lined by no membrane. *This was the only focal lesion found.* There were not even any agglomerations of pus around cranial nerves; no yellow tubercle at base; no pus. A section was made along the left peduncle, through the left corpus striatum to corona. The entire tract was found healthy. A band of fibres passed from tip of temporal lobe into the corpus striatum, and were easily to be distinguished. This was evidently the band described by Meynert as the second form of his first projection system: "A bow shaped bundle, passing from the cortex of the tip of the temporal lobe, which runs the length of the inner wall of the corpus striatum, until it passes into the anterior territory of its head as the stria cornea." (*Stricker's Handbuch*, Bd. I., p. 725.)*

Comparing the details of the autopsy with those of the thermometric measurements, we find:

That on the fourth day of manifest cerebral symptoms, the temperature of the right frontal region, which, according to our standard, should be 0.65 lower than the left, was 0.75 higher than the left, and 3.29 higher than normal. On the fifth day the temperature in this region was a degree and a half higher still, while the temperature of the left had risen only $\frac{4}{5}$ of a degree. On the sixth day—two days before death—when the rectal temperature was slightly subnormal, and collapse evidently beginning, the temperature of the frontal region, though fallen, still remained higher on the right side than on the left, and 1.79 above normal; while on this day the temperature of the left frontal region had fallen 0.86 below normal average. At the autopsy was found a patch of softening at the anterior extremity of the frontal lobe

* Ferrier's destructive and electrical experiments were made on the superior temporo-sphenoidal convolutions, and not on the middle nor at the tip of the lobe.

(see *ut supra*), indicating a localized encephalitis, that corresponded very well to this high temperature.

Again, on the fourth day of the cerebral symptoms, the temperature in the occipital region on both sides was 99.¼, an excess of 7.31 and of 6.59 over the normal. This excess corresponded well with the inflammation of the pia, covering the inferior surface of the cerebellum, at the base around the chiasma, and in the Sylvian fissures. The temperature of the vertical regions, on the other hand, was lower than any other part of the head, being 95¼ and 95⅜, until the commencing collapse at the time of the third measurement. This fact corresponded well with the moderate degree of inflammatory lesion on the convexity of the brain discovered at the autopsy. It would have been interesting to have examined the temperatures at various parts of the convexity, and have compared them with those obtained at a point presumed to be near the fissure of Rolando, where was present the maximum of convexity lesion (excluding the encephalitis of the right frontal lobe).

It is noticeable, however, that on the first two days, the right vertical region was hotter than the left by half a degree, although normally it should be a trifle cooler.

But when the general collapse of temperature, accompanying the cerebral effusion, set in, the right vertical temperature fell to 1½ degree below the left.

In view of the abscess of the tip of the left temporal lobe, it is much to be regretted that the parietal temperatures were not taken on the first day. But on the second (four days before death) the temperature was elevated much above the normal—3.91 on the right side and 2.06 on the left. Thus the highest temperature, and the greatest excess of temperature, did not correspond to the side on which existed evidences of the most marked inflammation. It seems probable that from the situation of the abscess, its temperature could not have been ascertained by measurements on the surface of the skull.